A WORD OR TWO ABOUT GARDENING

Becoming reacquainted with a long lost love – Citrus trees return

For many homeowners one essential ingredient of south Florida living has been absent for all too long - backyard citrus trees. A fortunate few escaped losing their trees during the citrus canker quarantine/eradication program when planting citrus in Miami-Dade was banned. This is not the time or place to comment on events of past 6 years save to say losing a tree was for many the same as the loss of a trusted pet – almost part of the family. As of now homeowners can start planting citrus trees and look forward once again to enjoying their own fresh squeezed orange juice, right-off-the tree chilled grapefruit and home baked key lime pie.

Before rushing out to purchase one or more trees you need to take the time to acquaint yourself with what is involved in growing citrus. This is especially so for those new to the area. Familiarize yourself with the traits of the different varieties of citrus (sweet oranges, tangerines and grapefruit) that are on offer at local nurseries. For those eager to replace citrus that was removed realize that quality trees are at present in short supply and expensive. Beware of over priced, poorly grafted trees and look for signs of disease or insect pests - buy from a reputable nursery that is familiar with its' stock. Remember too that when growing citrus not only is citrus canker still present but the presence of citrus greening, a new potentially more serious disease, was confirmed last year in multiple sites in SE Florida.

Citrus belongs to the Rutaceae, a plant family containing several popular ornamental plants such as orange jasmine (*Murraya paniculata*), *Calodendrum capense* (cape chestnut, an outstanding flowering tree, quite popular in California) and a rarely seen but attractive flowering shrub from the Caribbean, *Ravenia spectabalis*. Citrus trees can also be an ornamental asset in the landscape with attractive foliage, and fragrant blossoms. A distinctive feature of most citrus is a conspicuously winged petiole, especially noticeable in trees such as grapefruit. It is of course the fruit that is of prime interest, a special type of berry known as a hesperidium made up of rind (outer flavedo and inner albedo) enclosing the edible juicy flesh. This fleshy portion of the fruit is composed of segments each of which develops from compartments (locules) within the floral ovary in response to pollination/fertilization of the flower. The outer part of the rind (the flavedo) has a waxy surface, many oil glands and is initially green due to the presence of chlorophyll. As the fruit ripens the chlorophyll breaks down and other pigments (carotenoids) present in the rind become visible. The outer rind is attached to the fleshy portion of the fruit by the white, spongy albedo. What now follows is a quick overview of the citrus that can be grown in Miami-Dade.

Sweet orange: Trees vary as to the time of year they ripen fruit – early season fruit can be picked sometime between October and January, mid season between December and March and late season March into June. Early season varieties are especially advantageous where freezes are likely to damage a crop – not an important consideration for residents of Miami-Dade. Hamlin is an early season

seedless, very productive variety, though the quality is not as good as many later season varieties. Another early season variety of better quality, Ambersweet is a hybrid involving sweet orange, tangelo and Clementine which can be used for juice or dessert. Navel oranges are also an excellent early desert orange but not suited for juicing. They are better adapted to California's more Mediterranean climate and can be problematic in Florida. Yields are often poor due to a low rate of fruit set and severe fruit drop in late spring.

As a midseason choice the pineapple sweet orange (Dec – Feb) has been a long time local favorite for juicing - many seeds but sweet with a delicate flavor and no hint of bitterness. The tree tends to bear good crops only every other year and sometimes drops fruit prior to harvesting. Once ripe, fruit left on the tree declines in quality more rapidly compared to other varieties. Midsweet is a less well known mid-season orange ripening about 3-4 weeks after Pineapple. Eating quality is almost as good as Pineapple and fruit is less seedy so it can be used as both a juice and dessert orange. Fruit retains quality longer on the tree compared to Pineapple and is less prone to drop.

The Valencia, a late season variety (March – June), is the leading sweet orange grown in Florida and the states premier quality orange both for dessert and juice. Yields are less than for earlier varieties due to the presence of fruit from the previous season's crop inhibiting fruit set. Fruit is seedless and stores well if left on the tree, but in Miami-Dade's mild climate both rind and flesh develop less color.

Mandarins and Tangerines The Dancy (Dec – Jan) is very popular with homeowners but is no longer widely planted commercially. It produces small but excellent tasting fruit, but the tree is susceptible to alternaria, a disease causing severe leaf loss, die back of new shoots and corky lesions on fruit. Trees can also suffer limb breakage where crops are heavy and for this reason fruit should be thinned early. When harvesting, fruit should be clipped off the tree to prevent tearing the thin rind. The Robinson (Oct – Dec) is another popular tangerine (a hybrid involving the Clementine) but in contrast to Dancy it requires a cross pollinator for good crop production (see below). Quality of the fruit is excellent but tree limbs are brittle and break easily. Fruit is especially thin-skinned and splits easily (especially after heavy rainfall).

Ponkan (Dec – Jan) is of little commercial interest (difficult to ship), but is a popular mandarin variety with homeowners producing sweet fruit that is low in acid. It also needs to be clipped off the tree to prevent tearing the rind.

Tangerine Hybrids: Often popularly referred to as oranges, the Temple (Jan – March) and the Honeybell (Dec – Feb) are both tangerine hybrids. The Temple is a tangor (cross between a tangerine and a sweet orange) and the Honeybell a tangelo (cross between a grapefruit and a tangerine). Correctly known as the Mineola tangelo, the Honeybell produces excellent fruit though yields are poor and fruit can be seedy. As with many tangerines and their hybrids, crop yields can be improved somewhat by providing a suitable pollinator tree. In Miami-Dade the Temple can serve this purpose for all of the common tangerine cultivars. It produces excellent quality dessert fruit and is well adapted to south Florida conditions. It is prone to scab (a disease of foliage, fruit and stems) and infestation by aphids. Like the

Temple, the Murcott (Jan – March, sometimes popularly referred to as the honey tangerine) is another tangor which does not need a pollinator. It tends to bear fruit on alternate years, with heavy crops that can result in tree limb breakage as well as a fatal precipitous tree decline. Thinning of the crop and applications of additional fertilizer (potassium) may help to alleviate these problems.

Grapefruit: The grapefruit probably evolved from a natural cross between a sweet orange and a pummelo (see below). Grapefruit varieties can be divided on the basis of flesh color (white or pink/red) and seed content. Duncan (Nov – May) is a white fleshed grapefruit, the first to be commercially grown in Florida and still regarded by most as the best tasting. Its main commercial drawback is the large number of seeds and for this reason it was largely replaced by the seedless Marsh (Nov – May), even though the Duncan is superior in eating quality. Pigmented grapefruit varieties have become increasingly popular the first being Thompson (Dec – May), a pink mutation of a Marsh which it resembles in eating quality. This variety is little grown now having been succeeded by other pigmented varieties such as Redblush, and the darker pigmented Flame and Rio Red, all ripening from Nov – May.

Unlike sweet oranges and tangerines, locally grown grapefruit colors evenly. It can be left on the tree for prolonged periods without much loss of quality – some fruit from the previous year is usually still present as the tree flowers and sets a new crop.

Acid Fruits: Mediterranean type lemons such as Eureka and Lisbon (the types sold in produce departments) are not suited to south Florida's hot wet climate. The Meyer lemon (Nov – March), which is not a true lemon (orange/lemon hybrid) more closely resembles an orange in shape. It is occasionally grown by homeowners as a substitute for lemon. The tree is small, thornless and attractive, the fruit very juicy but less acid and more insipid compared to commercially grown lemons. The more acidic Ponderosa (an ever bearing lemon citron hybrid) and bitter lemon are both of inferior quality.

Limes are a better choice for Miami-Dade, with Tahitian limes having been commercially produced until quite recently. The Tahitian or Persian lime is probably a hybrid involving the true lime and a citron. The fruit is seedless and harvested while still green, though when fully ripe it turns yellow. Unlike other locally grown citrus, lime trees flower several times throughout the year and bear fruit for much of the year, most being ready for harvesting from June to September. Tahitian lime can be propagated by air layering and come into production quicker than grafted trees but such trees develop a weaker root system and are more liable to topple in a windstorm.

Not as large as Tahitian lime, the Key lime (true lime) is a bushy, more thorny tree with smaller fruit which often contains numerous seeds. The fruit turns yellow on the tree and is more aromatic with an acid content approaching that of a lemon. Key lime can be readily grown from seed and will produce a fruiting tree within 3-4 years. Trees can even be grown from cuttings or air layers and will often bear fruit within 18 months, though weak rooted compared to seed grown trees. Key lime requires far less water and fertilizer (nitrogen) compared to other locally grown

citrus. It is well adapted to both local climate and the poor rocky limestone soils of Miami-Dade.

The calamondin is a small thorny upright tree thought to be a hybrid involving a sour mandarin and a kumquat. Valued more for its' ornamental contribution to the landscape, the small orange fruits are very acidic but can be used to make a reasonable if not intensely flavorful marmalade. Trees can be readily grown from seed or cuttings. For superior fruit the kumquat is also a small highly decorative tree with very fragrant blossoms. Kumquats are not true citrus but in a small closely related genus, *Fortunella*. Both the piquant, sweet-tasting rind and acidic flesh are edible – Nagami is a 12-14' tree and 'Meiwa' is a hybrid, more compact and bushy the fruit larger and sweeter with thicker peel and less juice. Both ripen from November into March.

Pummelo: This is the most tropical citrus, popular in SE Asia (Thailand. Southern China) and grown commercially on a very limited basis in Miami-Dade. Pummelo trees are small to medium size low branching with large, very fragrant flowers and very large pear-shaped fruit weighing 3 lbs and more. The peel (albedo) is thick, but can be removed quite easily. The pummelo hybridizes readily with other citrus resulting in a vast number varieties differing greatly in size, shape and flavor (some acidic and quite sweet, others bland). Pummelos grown in Miami-Dade originated in Thailand. Trees may flower up to 4x per year with fruit ready to harvest from November to February. In view of the thick peel it is not surprising that the fruit has a long shelf life after harvesting.

Rootstocks: Most citrus, apart from some hybrids, grows more or less true from seed (unlike avocado or most common Florida mangoes). Despite this, citrus trees are usually propagated by taking budwood (the scion) from a variety bearing superior fruit and grafting this onto a suitable rootstock. Originally, grafting was found necessary in order to protect trees from phytopthora foot/root rot. Apart from improving resistance to several other diseases, selecting an appropriate rootstock can allow the tree to adapt to specific climatic/soil conditions, modify growth habit and improve fruit quality. The period before the tree bears fruit is also reduced. Compare the time taken until a budded sweet orange will commence to produce, 2-3 years, with the 10-12 years for a seed grown tree.

In Miami-Dade it is important to select trees on rootstocks that not only afford disease protection (especially from phytophthora), but are also tolerant of alkaline (high pH) often wet soil conditions. In general, trees grafted on sour orange (includes Smooth Flat Seville now becoming more common), Cleopatra mandarin and Volkamer lemon exhibit good tolerance of alkaline soils and phytophthora. Not suitable as rootstocks for Miami-Dade are sweet orange, Swingle, Troyer or Carrizo. A reputable nursery will be able to tell what rootstocks have been used for the citrus trees offered for sale. Be especially wary buying trees out of area. If you are thinking of buying citrus trees on the return trip from one of central Florida's theme parks, growing conditions there are quite different. Freezes are more likely and soils sandy and more acid for which Swingle is an acceptable, frequently used rootstock.

Planting and establishing a citrus tree: Citrus trees can be planted at any time, though sometime during the warmer months of the year is best for tender,

more tropical trees such as pummelo and key lime. As for any tree the planting hole should be no deeper than the rootball and 2-3x the diameter with sloping sides. Remove some of the loose soil from the root ball before setting the tree in the hole. Incorporate no more than 10 – 15% organic matter into the soil removed from the planting hole and use this as backfill. Never use bagged topsoil as backfill and do not place soil on top of the root ball. An area of at least 3' around the tree should remain clear of turf grass or any other groundcover. Hand-pull weeds as they appear and/or apply glyphosate using a wipe-on herbicide applicator. It is especially important to keep the base of the trunk free of weeds so that there is buoyant air circulation to prevent moisture build up at the soil line. Avoid organic mulches such as wood chips – a one inch covering of ¼ to ½" Chattahoochee rock is preferable.

Water lightly but often (sufficient to prevent the root ball from drying) for the first 3-4 weeks, then as the tree becomes established reduce the frequency but increase the amount of water. If wilting of new growth occurs (more likely for trees planted in late winter/spring), apply water immediately and try to ensure the soil remains evenly moist. Once fully established watering may not be necessary for much of the summer and fall. However, February to May (the driest part of the year) coincides with the period when trees bloom, set fruit and are supporting a rapidly developing crop. At this time it is essential to water the tree on a regular basis to help minimize fruit loss and ensure quality.

Pruning a new tree should not be necessary, except for prompt removal of any growth sprouting from the rootstock. Producing trees rarely require pruning except to remove damaged limbs or deadwood. Removal of the latter is especially important on Tahitian limes in order to prevent infection with the fungus causing melanose. Any water sprouts (vigorous vertical shoots that grow skyward) are unproductive and should be removed. Light fertilizer applications (¼lb complete 8/8/8) can begin 4-6 weeks after planting or when new growth (swollen buds) is first noticed. Make applications every 6 weeks increasing the amount up to 1 lb by the end of the first year. By the beginning of the third year the number of fertilizer applications should have been reduced to 4, each of 2 lbs, plus 2-3 foliar applications of a nutritional spray to correct trace element deficiencies. From the fifth year on, provide a total of 12½ lbs fertilizer split into 3 applications. For key limes fertilizer amounts should be only a third of the amounts given above.

Fruit ripening and when to pick: Exposure of ripening fruit to warm temperatures increases sugar content, but color development requires cool temperatures. The mild late fall/winter climate of Miami-Dade means that oranges and tangerines may be unevenly colored, but of excellent eating quality. Homeowners often mistakenly leave fruit on the tree because it is still part green waiting for it to develop more color only to find that when picked it has become dry. The best way to judge whether fruit is ready to harvest is to know the months the citrus variety in question ripens and to taste test during this period. Grapefruit colors evenly as it ripens and can remain on the tree, however if left too long it will also become dry and seeds (if present) will start to germinate. There can be other reasons for dry fruit (e.g., rootstock used) and it is not an uncommon problem on

young trees. Don't be discouraged if the overall quality of fruit from a young tree is not what you expected. More often than not it will improve as the tree matures.

In the next article we will consider pest, disease and nutritional problems for backyard citrus growers. I am indebted to Dr Carlos Balerdi, Commercial Fruit Tree Agent at the Miami-Dade County Extension Office for the benefit of his expertise.

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